

- 2 -

Amendments to Claims

1. (Currently Amended) A fuel cell stack for a fuel cell power plant, comprising:

a plurality of fuel cells arranged in a stack, each including a membrane electrode assembly having a proton exchange membrane between a cathode catalyst and an anode catalyst, an anode support plate adjacent said anode catalyst, a cathode support plate adjacent said cathode catalyst, a porous anode water transport plate having a fuel reactant gas flow field adjacent said anode support plate, and a porous cathode water transport plate having an oxidant reactant gas flow field adjacent to said cathode support plate, ~~at least one of said~~
10 ~~water transport plates in each cell having water flow channels;~~

a plurality of solid plates, selected from one or more of solid cooler plates and solid separator plates, ~~disposed~~ interposed between ~~at least some~~ adjacent
ones of all of said cells in said stack; and

water transfer means disposed in ~~each of~~ said fuel cell[[s]] stack for
15 transferring water only internally within said stack from said cathode water transport plate of at least one of said fuel cells to at least one of said anode water transport plates which may be within said one fuel cell or a different fuel cell.

2. (Cancelled)

3. (Currently Amended) A fuel cell stack according to claim 1:
wherein ~~each~~ at least one of said water transport plates ~~which is~~
~~contiguous with one of said solid plates~~ has a water flow field ~~adjacent to said~~
~~contiguous solid plate.~~

4, 5. (Cancelled)

- 3 -

6. (Currently Amended) A fuel cell stack according to claim [[5]] 1 wherein said water transfer means comprises at least one internal water manifold which extends completely through each of said fuel cells and each of said solid ~~separator~~ plates, and is in liquid communication with said porous water transfer transport plates of each of said fuel cells.

7. (Currently Amended) A fuel cell stack according to claim [[4]] 1 wherein said water transfer means comprises ~~at least one~~ a plurality of internal water manifolds, each of which extends completely through ~~each~~ a small group of said fuel cells ~~and each of said solid cooler plates, said at least one manifold in~~ liquid communication with said porous water transport plates of the fuel cells in the corresponding group.

8. (Cancelled)

9. (Original) A fuel cell stack according to claim 1 wherein said water transfer means comprises a high water permeability proton exchange membrane.

10. (Original) A fuel cell stack according to claim 9 wherein said membrane has a microporous water-filled phase in excess of 10 volume %.

11. (Original) A fuel cell stack according to claim 9 wherein said membrane has a microporous water-filled phase between 15 volume % and 25 volume %.

12. (Currently Amended) A fuel cell stack according to claim 1 wherein said water transfer means comprises a water transport band in each fuel cell constructed of [[a]] particles that [[is]] are wettable, non-conductive and ~~has~~ have a particle size of 5 microns or less, said band extending from said cathode water

- 4 -

5 transport plate to said anode water transport plate within the corresponding fuel cell.

13. (Currently Amended) A fuel cell stack according to claim 12 wherein said water transfer ~~band comprises~~ bands comprise silicon carbide.

14. (Currently Amended) A fuel cell stack according to claim 13 wherein said silicon carbide is ~~screen-printed~~ deposited onto a support plate of each said fuel cell in sufficient thickness so as to accommodate the thickness of said support plates and said catalysts.

15. (Cancelled)

16. (Currently Amended) A fuel cell stack according to claim 1 wherein porous water transfer zones are adjacent to at least one edge of each said ~~at least one~~ fuel cell, said water transfer zones of each cell are contiguous and in water communication with ~~said~~ at least one edge of said cathode water transport plate of said each cell and with ~~said~~ at least one edge of said anode water transport plate of the same cell.

17. (Original) A fuel cell stack according to claim 16 wherein said water transfer zone includes a flow restriction between said cathode water transport plate and said anode water transport plate.

18. (Original) A fuel cell stack according to claim 1 wherein about 90% of product water generated at the cathodes of said fuel cells is removed from said stack as vapor in exhaust of said oxidant reactant gas flow field, about 30% of product water generated at the cathodes of said fuel cells is transferred wholly within said stack from said cathode water transport plates of said stack to the

- 5 -

anode water transport plates of said stack, and about 10% of the product water generated at the cathodes of said fuel cells is expelled as liquid water through exhaust of said anode water transport plates.

19. (Previously Amended) A method according to claim 20, comprising:
expelling 80%-95% of product water generated at the cathodes of the fuel cells of said stack as vapor in the exhaust of said oxidant reactant gas flow fields;
transferring, by means of at least one water transfer path within said stack,
5 between 25% and 40% of product water generated at the cathodes of said fuel cells from said cathode water transport plates of said fuel cells to said anode water transport plates of said fuel cells; and
removing between 5% and 15% of product water generated at the cathodes of said fuel cells to exhaust from said anode water transport plates.

20. (Currently Amended) A method of operating a fuel cell power plant having a stack of fuel cells, each fuel cell including a membrane electrode assembly having a proton exchange membrane between a cathode catalyst and an anode catalyst, an anode support plate adjacent said cathode catalyst, a cathode support
5 plate adjacent said cathode catalyst, a porous anode water transport plate having fuel reactant gas flow field adjacent said anode ~~transport support~~ plate, and a cathode water ~~transport support~~ plate having an oxidant reactant gas flow field adjacent to said cathode support plate, ~~at least one of said water transport plates of each cell having water flow channels~~, and a plurality of solid plates, selected
10 from one or more of solid cooler plates and solid separator plates, ~~disposed~~ interposed between ~~at least some adjacent ones of all~~ of said cells, said method comprising:

transferring water only internally within said fuel cell stack from said cathode water transport plate of at least one of said fuel cells to at least one of

- 6 -

15 said anode water transport plates which may be within said one fuel cell or a different fuel cell.

21. **(Previously Amended)** A method according to claim 20 comprising conducting water only internally within said fuel cell stack from a cathode water transport plate at a first end of said fuel cell stack to an anode water transport plate at a second end of said fuel cell stack opposite said first end through at least one
5 internal water manifold in liquid communication with all of said water transport plates.